

WHAT IS CLAIMED IS:

1. A network element for a telecommunications network, comprising:

a port for connection to a transmission line of a telecommunications network;

a plurality of transmission line interfaces, the transmission line interfaces each including a scheduler to transmit traffic in port transmission slots allocated to the transmission line interface;

a storage medium; and

an interface controller stored in the storage medium, the interface controller operable to selectively couple transmission line interfaces to the port and to allocate a disparate portion of port transmission slots to each of the transmission line interfaces coupled to the port.

2. The network element of Claim 1, further comprising:

a plurality of ports for connection to disparate transmission lines of the telecommunications network; and

the interface controller operable to selectively couple at least two of the transmission line interfaces to each port and, for each port, to allocate a disparate portion of port transmission slots to each of the transmission line interfaces coupled to the port.

3. The network element of Claim 1, wherein the network element comprises an asynchronous transport mode (ATM) element.

4. The network element of Claim 1, wherein the network element comprises a telephony switch.

5. The network element of Claim 1, further comprising:

a map of port transmission slots, the map comprising:

a plurality of hierarchical sets of port transmission slots;

the hierarchical sets comprising a plurality of parent sets each having its port transmission slots divided between a plurality of child sets;

the child sets comprising interleaved port transmission slots; and

the interface controller further operable to selectively allocate to each of the transmission line interfaces coupled to the port a disparate hierarchical set of the port transmission slots from the map.

6. The network element of Claim 5, the hierarchical sets each further comprising substantially evenly spaced port transmission slots.

7. The network element of Claim 2, further comprising:

a map of port transmission slots for each of the ports, the maps each comprising:

5 a plurality of hierarchical sets of port transmission slots;

the hierarchical sets comprising a plurality of parent sets each having its port transmission slots divided between a plurality of child sets;

10 the child sets comprising interleaved port transmission slots; and

the interface controller further operable to selectively allocate to each of the transmission line interfaces coupled to a port a disparate hierarchical set of port transmission slots from the map for the port.

8. The network element of Claim 1, further comprising:

the interface controller operable to generate a map of port transmission slots, the map comprising:

20 a plurality of hierarchical sets of port transmission slots;

the hierarchical sets comprising a plurality of parent sets each having its port transmission slots divided between a plurality of child sets;

25 the child sets comprising interleaved port transmission slots; and

the interface controller operable to selectively allocate to each of the transmission line interfaces coupled to the port a disparate hierarchical set of port transmission slots from the map.

9. The network element of Claim 2, further comprising:



10. A telecommunications system, comprising:  
a first network element coupled to a remote second  
network element via a transmission line;  
the first network element comprising:  
5 a port connected to the transmission line;  
a plurality of transmission line interfaces, the  
transmission line interfaces each including a scheduler to  
transmit traffic in port transmission slots allocated to  
the transmission line interface;  
10 a storage medium; and  
an interface controller stored in the storage  
medium, the virtual interface controller operable to  
selectively couple transmission line interfaces to the port  
and to allocate a disparate portion of port transmission  
15 slots to each of the transmission line interfaces coupled  
to the port.

11. The telecommunications system of Claim 10,  
further comprising:

20 a map of port transmission slots, the map comprising:  
a plurality of hierarchical sets of port  
transmission slots;  
the hierarchical sets comprising a plurality of  
parent sets each having its port transmission slots divided  
25 between a plurality of child sets;  
the child sets comprising interleaved port  
transmission slots; and  
the interface controller further operable to  
selectively allocate to each of the transmission line  
30 interfaces coupled to the port a disparate hierarchical set  
of port transmission slots from the map.

12. The telecommunications system of Claim 11, the hierarchical sets each further comprising substantially evenly spaced port transmission slots.

5           13. The telecommunications system of Claim 10, further comprising:

the interface controller operable to generate a map of port transmission slots, the map comprising:

10           a plurality of hierarchical sets of port transmission slots;

the hierarchical sets comprising a plurality of parent sets each having its port transmission slots divided between a plurality of child sets;

15           the child sets comprising interleaved port transmission slots; and

the interface controller operable to selectively allocate to each of the transmission line interfaces coupled to the port a disparate hierarchical set of port transmission slots from the map.

20

14. A method for transmitting traffic in a transmission line, comprising:

coupling a plurality of schedulers to a port for a transmission line; and

5 using each of the schedulers to transmit in a portion of port transmission slots allocated to the scheduler traffic designating a virtual tunnel defined by the portion of port transmission slots.

10 15. The method of Claim 14, further comprising using at least one of the schedulers to transmit dynamic traffic in the portion of port transmission slots.

15 16. The method of Claim 14, further comprising using at least one of the schedulers to transmit a combination of dynamic and dedicated traffic in the portion of port transmission slots.

20 17. The method of Claim 14, further comprising using at least one of the schedulers to transmit available bit rate (ABR) asynchronous transport mode (ATM) traffic in the portion of port transmission slots.

25 18. The method of Claim 14, further comprising using at least one of the schedulers to transmit unspecified bit rate (UBR) asynchronous transport mode (ATM) traffic in the portion of the port transmission slots.

30 19. The method of Claim 14, further comprising selectively allocating to each of the schedulers the portion of port transmission slots.

20. The method of Claim 14, further comprising separately queuing traffic for each scheduler.

21. A method for transmitting traffic in a virtual tunnel of a transmission line, comprising:

receiving a request to transmit specified traffic in a virtual tunnel having a bandwidth;

coupling a scheduler to the port;

identifying from the map a hierarchical set of port transmission slots providing at least the bandwidth;

allocating the hierarchical set of port transmission slots to the scheduler; and

using the scheduler to transmit the specified traffic in the hierarchical set of port transmission slots.

22. The method of Claim 21, further comprising coupling a queue to the scheduler to queue the specified traffic for transmission by the scheduler.

23. The method of Claim 21, providing the map of port transmission slots comprising:

selecting a plurality of substantially evenly spaced port transmission slots as an initial set of transmission slots;

dividing the initial set into a plurality of child sets having interleaved port transmission slots;

recursively dividing each child set into a plurality of lower level child sets having interleaved port transmission slots until child sets in a lowest level each correspond to a base transmission rate; and

storing the initial set and the child sets as the plurality of hierarchical sets.



24. The method of Claim 21, further comprising using the scheduler to transmit specified dynamic traffic in the hierarchical set of transmission slots.

5 25. The method of Claim 21, further comprising using the scheduler to a combination of dedicated and dynamic traffic in the hierarchical set of transmission slots.

0997626-12004  
T08277-929660

26. A propagated signal embodied in a transmission media, comprising:

a virtual tunnel comprising a predefined portion of a bandwidth of the transmission media; and

5       dynamic traffic propagated in the virtual tunnel.

27. The propagated signal of Claim 26, the dynamic traffic further comprising available bit rate (ABR) asynchronous transport mode (ATM) cells.

10

28. The propagated signal of Claim 26, the dynamic traffic further comprising unspecified bit rate (UBR) asynchronous transport mode (ATM) cells.

15

29. The propagated signal of Claim 26, the virtual tunnel comprising a plurality of substantially evenly spaced transmission slots of the transmission media.

20

30. The propagated signal of Claim 26, further comprising:

a plurality of virtual tunnels; and

the virtual tunnels each comprising a plurality of substantially evenly spaced transmission slots of the transmission media.

25

31. The propagated signal of Claim 30, the virtual tunnels further comprising interleaved transmission slots.

30

32. The propagated signal of Claim 31, at least two of the virtual tunnels comprising disparate bandwidths of the transmission media.